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THIRD UNITED NATIONS CONFERENCE ON THE EXPLORATION AND PEACEFUL USES OF OUTER SPACE

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Abstract of the paper of the International Astronomical Union

1. Understanding the nature of the universe is one of mankind's oldest and most persistent fascinations. The present century has seen phenomenal progress in all areas of astronomy, from exploration within the solar system to discoveries of the echo of the big bang and vast cosmic explosions occurring even today. Observations from space over the last half century have played a vital role in that breakthrough by enabling astronomers to study the universe at all wavelengths of the electromagnetic spectrum. Conversely, the quest for astronomical knowledge remains a powerful motivation for the continued scientific exploration of space. As the international non-governmental organization uniting professional astronomers worldwide, the International Astronomical Union (IAU) welcomes the initiative by the United Nations to hold the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III) to address the goals, means and guidelines for the continued development of space activities in the first decades of the new millennium. IAU appreciates the opportunity to take part in that important event and thereby offer its assistance and present its concerns for the continued vitality of scientific research in the future exploration and utilization of space.

2. IAU strongly supports the principle underlying the United Nations space treaties that "space is the heritage of all mankind". In the view of the Union, the practical implementation of that ideal comprises at least the following elements: (a) assistance to capacity-building, especially in developing countries, so that all nations may acquire the human resources needed to reap the benefits of basic and applied space science; (b) preservation of the space environment, in all its aspects, so that international scientific research does not suffer unnecessary or undue harm from other activities in space; and (c) free international cooperation in the scientific exploration of space by scientists of all nations. The following briefly outlines the commitments and concerns of IAU in each of those areas.

I. Capacity-building in astronomy and basic space science

3. The key need for any country to participate profitably in the space enterprise is simple: a resource of well-educated scientists and engineers, employed in the service of their country and with the tools to put their ingenuity and experience to good use. While astronomy is but one in the wide spectrum of necessary skills, the immediate fascination of astronomy for bright young minds is a proven, effective means to attract them into a science education. And modern astronomy education equips graduates with experience in scientific reasoning and method as well as with skills in mathematics, physics and computation, including image-processing techniques, which qualify them for a wide range of careers in applied as well as basic science.

4. IAU conducts a range of capacity-building programmes in developing countries that cover the development of astronomy as a paradigm of science education, from the formation of high school teachers over the development of university undergraduate and graduate courses to support to exchange programmes for isolated staff scientists. IAU applauds the United Nations initiative, as a follow-up to the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space, held in 1982, to establish regional educational centres for space science and technology. IAU, in collaboration with the Committee on Space Research (COSPAR), proposes to enhance the attraction of the United Nation centres to young people by offering a component of astrophysics and basic space science to the curricula of the centres, creating a synergy between the complementary capabilities of professional non-governmental organizations and those of the United Nations system. An IAU-COSPAR-United Nations Special Workshop on Education is to be organized during UNISPACE III to discuss those possibilities.

II. Preserving the space environment

5. The accelerating development of activities in space is leading to a rapidly increasing deterioration of the space environment. Because of the extreme faintness of cosmic sources and the great sensitivity of astronomical observations, astronomers are the first to feel the negative impact of that development, but the signs are clear: space is another natural resource once believed to be infinite that is showing inexorable symptoms of overexploitation. Maybe "only" science will suffer at first, but it will not be alone for long.

6. The most serious immediate threat is the dramatic increase in radio frequency interference at all frequencies, mainly as a result of the rapidly increasing demands of the space telecommunications industry for more frequency space: an ordinary portable telephone, if placed on the Moon, would be one of the brightest sources in the radio astronomical sky! Communications from scientific satellites in other disciplines are also now being threatened, however. International agreements are needed, as a matter of urgency, to ensure protection of the key frequencies for radio astronomy and to promote the adoption of technical measures to reduce the levels of sideband emissions from communications satellites outside their allocated wavelength bands.

7. Space debris is another ever-increasing hazard to both scientific satellites and ground-based astronomical observations. IAU appreciates the initiative taken by the Committee on the Peaceful Uses of Outer Space to commission a comprehensive study of those issues and to formulate recommendations for preventive measures that can and should be taken by space agencies, whether public or private, to avert an exponential growth of the problem.

8. A third threat to the space environment is presented by recurrent plans to launch very luminous objects into space for solar illumination or energy transmission, or for artistic, celebratory or commercial advertising purposes. Projects have been proposed, some reaching the experimental stage, that would have illuminated the Earth with an intensity several times that of the full Moon. Such displays could cause not only the demise of ground-based extragalactic astronomy and cosmology, but also a violation of the aesthetic, natural or religious values of nations worldwide. No regulations currently prevent the launch of such experiments by non-national agencies. IAU urgently appeals to the nations of the world, through the Committee on the Peaceful Uses of Outer Space, to subject projects of a potentially harmful nature to prior international consultations before it is too late.

9. Finally, the danger that future space missions to bodies of the solar system might pollute them irreversibly is of strong concern to the IAU and COSPAR. Better international guidelines

for the prevention of planetary pollution in its many forms are needed and the Committee on the Peaceful Uses of Outer Space is the forum in which to discuss such measures.

III. Global cooperation and communication

10. The rapid, worldwide communication, dissemination and coordination of scientific discoveries is of key importance in many branches of astronomical research and is one of the main tasks of IAU. Results are not only of purely scientific, but also sometimes of practical significance, as two examples will show.

11. Firstly, international cooperation in the collection, collation and interpretation of observations of near-Earth objects is essential for early assessment of the tiny, but real risk of a potentially devastating impact in the foreseeable future and to refine the precise computations needed for any mitigation measures in case a significant danger of an impact were to be substantiated. IAU is working with observers and agencies worldwide to optimize scientific methods and to implement appropriate warning procedures for research on near-Earth objects. Secondly, astronomers observing with spacecraft have charted the amount of light being scattered uselessly into space from poorly designed lighting fixtures on the ground. The growing light pollution makes increasingly large areas of the Earth unusable for astronomical observations, but the light visible from space also represents wasted energy for hundreds of millions of dollars and is beginning to have a negative impact on the environment in densely populated areas. IAU-sponsored meetings, such as the IAU-COSPAR-United Nations Special Environmental Symposium to be held at UNISPACE III itself, help to identify such negative effects and to promote simple, cost-effective energy conservation measures benefiting laymen and astronomers alike.

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Abstract of the paper of the Committee on Space Research

1. The traditional role of the Committee on Space Research (COSPAR) is to provide a meeting ground for scientists involved in fundamental research and then to provide the means for rapid publication of results. Over four decades, providing that service has brought recognition to COSPAR as the premier forum for presenting the most important results in space research in all disciplines. During that period COSPAR has also become the world's largest professional, self-governing body of space scientists, with a membership composed of 40 national scientific institutions, 12 international learned bodies and over 4,000 individual and industrial associates.

2. The growing societal importance of coupling space science to technology and of deploying efforts to aid the development of human intellectual potential has brought a new emphasis to the Committee's activities in several ways. In addition to strengthening its traditional cooperation with the International Astronautical Federation, which has resulted in a series of symposia organized jointly on an annual basis for the past 15 years during the scientific and technical sessions of the Committee on the Peaceful Uses of Outer Space, COSPAR has created a new class of membership to respond to the needs of industrial organizations with an interest in space. It is hoped that that link will increase the Committee's range of activities and allow the practical needs of industry to be better understood and assimilated into future plans for space exploration. It is hoped in particular that the synergy between the innovation so natural to the scientist and the understanding of market forces so pre-eminent in industry will create better conditions for the rapid conversion of results from investigations of near-Earth space into technologies mature enough for application.

3. In order to react properly to potential opportunities created by a better understanding of and possible dangers resulting from natural processes in space, COSPAR recently created two new panels, on space weather and planetary protection. The aim is to monitor closely and, if feasible, to influence the development of understanding and policy in those areas.

4. COSPAR can also offer considerable expertise in coordinating activities that are of particular interest to less developed nations that intend to participate in space programmes. For almost two decades, COSPAR, through its Panel on Space Research in Developing Countries, has run a special programme that promotes in those countries space research in disciplines important from the point of view of the interested parties.

5. In a related activity, COSPAR, recognizing the paramount importance of investment on the part of the scientific community in the development of human potential, also plans to launch a series of specialized workshops whose aim will be to contribute to the general programme of capacity-building in science that is currently being discussed within the

Committee's mother organization, the International Council for Science (ICSU). Specifically, COSPAR action will be aimed at reducing the isolation of scientists in countries where the scientific infrastructure is not greatly developed by helping to integrate local research activities into the mainstream of space science currently being conducted elsewhere.

6. Another important role assumed by COSPAR is to act as an intermediary, facilitating direct contacts between scientists from different geographical areas. This activity is carried out across the whole spectrum of space disciplines and is supported by a COSPAR-sponsored and COSPAR-organized programme of financial assistance. The main effort is directed towards supporting attendance at scientific meetings. This activity has always been very strongly present in COSPAR programmes.

7. COSPAR's record as the most representative international scientific organization on all matters related to research in space puts it in the position of a well-tested machine, instrumental for efficient and rapid dissemination of the newest results pertaining to all areas of space research and able to promote a truly unbiased and global assessment of proposed programmes of exploration in space.

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Abstract paper of the International Society for Photogrammetry and Remote Sensing

The International Society for Photogrammetry and Remote Sensing (ISPRS) is a non-governmental organization composed of 167 member societies and organizations representing 103 countries and areas. ISPRS is devoted to the development of international cooperation for the advancement of knowledge, research, development and education in photogrammetry, remote sensing and spatial information sciences, their integration and their applications, with a view to contributing to the well-being of humanity and the sustainability of the environment. ISPRS represents the international remote-sensing community as a non-governmental organization having observer status with the Committee on the Peaceful Uses of Outer Space and as a participant in joint activities with the Office for Outer Space Affairs of the Secretariat. With regard to remote sensing from space, ISPRS places importance on the following four areas of priority to be considered by the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space: sustainable Earth observation; non-discriminatory access; support to developing countries; and international obligations. ISPRS recommends that the space community should: shift priorities in remote sensing towards information production; use non-governmental organizations such as ISPRS to facilitate cooperative dialogue between the public sector and the private sector; clarify portions of the Principles Relating to Remote Sensing of the Earth from Outer Space (General Assembly resolution 41/65, annex); enhance capacity-building initiatives; and improve international understanding of international treaties on the environment.

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